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## MEMORANDUM

To: Mr. Brian Dickson, DSATS Coordinator  
DeKalb-Sycamore Area Transportation Study (DSATS)

From: Timothy P. Sjogren, P.E., PTOE  
Sara Disney Haufe, P.E., PTOE

Date: June 30, 2014

RE: 2014 DSATS Freight Movement Study  
DeKalb, Sycamore, and Cortland, Illinois

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The DeKalb-Sycamore Area Transportation Study (DSATS) retained TADI to perform a routing analysis of freight trucks through the region. Truck counts and license plate data were collected at 14 total locations and evaluated in order to estimate the proportion of area truck traffic performing through (non-stop) movements in DeKalb, Sycamore, and Cortland. The first version of this study was performed for DSATS in 2007 by Metro Transportation Group in response to community concerns about through truck trips in the downtown sector of DeKalb. The following sections detail the study methodology, results, and analysis, including a comparison to the 2007 study and an estimate of daily through truck trip volume at each study location.

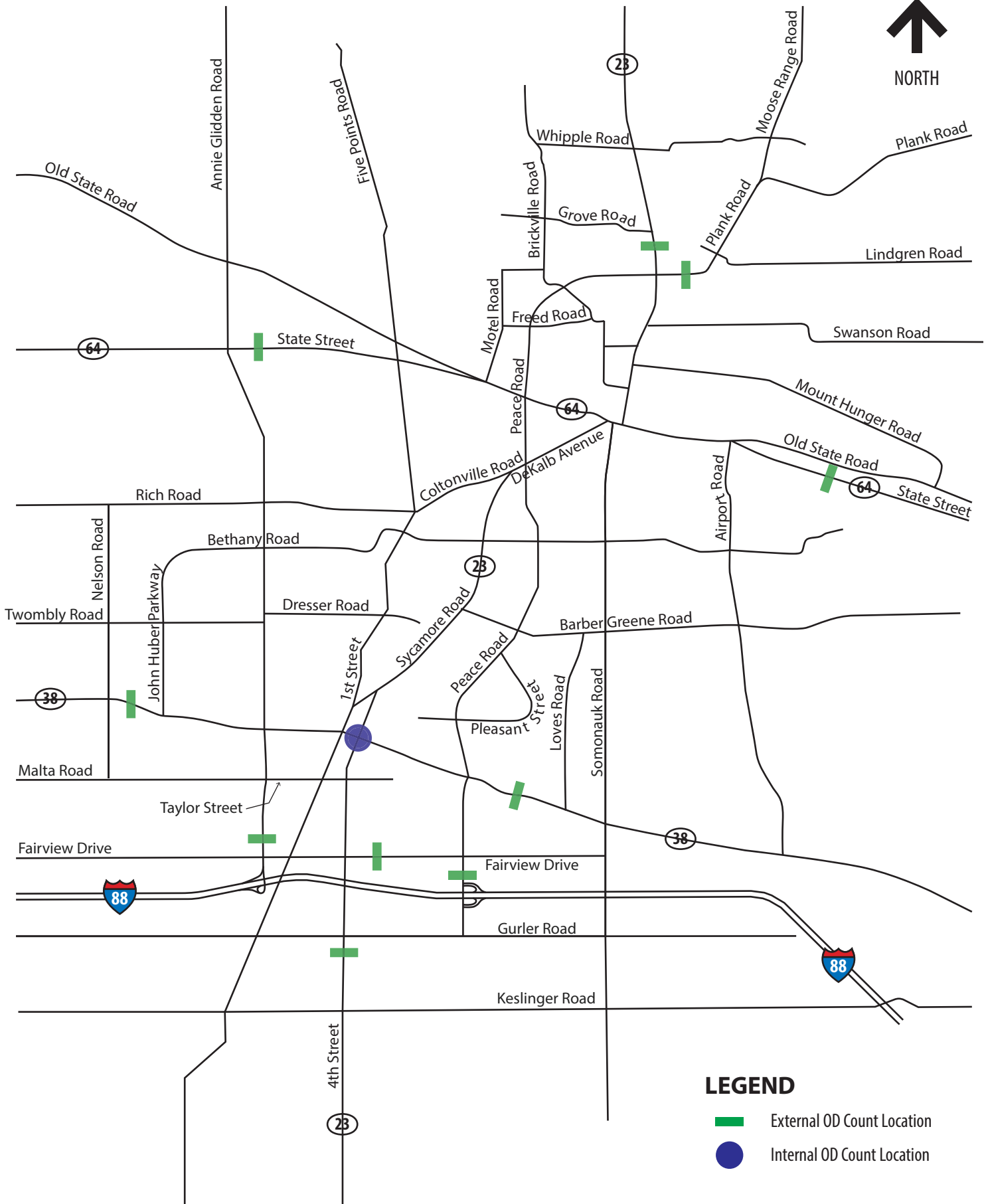
### METHODOLOGY

Following the scope of work set for the 2007 Truck Routing Study, DSATS staff specified 14 data collection locations for this study, as shown on **Exhibit 1**. Ten external points were selected to create a loose cordon around the study area at locations believed to be common points of entry and exit for freight truck traffic. In addition, four internal study locations were placed in downtown DeKalb at the IL 23/IL 38 intersection, which has historically been perceived as a high truck traffic location. Each of the study locations are listed as follows:



- Peripheral Locations
  - IL 23 south of Gurler Road (northbound = inbound, southbound = outbound)
  - Peace Road south of Fairview Drive (northbound = inbound, southbound = outbound)
  - Fairview Drive east of IL 23 (westbound = inbound, eastbound = outbound)
  - IL 38 west of Somonauk Road (westbound = inbound, eastbound = outbound)
  - IL 64 east of Airport Road (westbound = inbound, eastbound = outbound)



NORTH



**LEGEND**

-  External OD Count Location
-  Internal OD Count Location



- Plank Road east of IL 23 (westbound = inbound, eastbound = outbound)
- IL 23 north of Plank Road (southbound = inbound, northbound = outbound)
- IL 64 east of Annie Glidden Road (eastbound = inbound, westbound = outbound)
- IL 38 west of Annie Glidden Road (eastbound = inbound, westbound = outbound)
- Annie Glidden Road north of Fairview Drive (northbound = inbound, southbound = outbound)
- Interior Locations
  - IL 23 north of IL 38
  - IL 23 south of IL 38
  - IL 38 east of IL 23
  - IL 38 west of IL 23

On Tuesday, April 22, and Wednesday, April 23, 2014, high-definition cameras were mounted at each of these 14 locations to obtain a video recording of both directions of traffic during three study periods: AM Peak (7:00-10:00AM), Midday (10:30AM-1:30PM), and PM Peak (3:30-6:30PM). From early April to early May 2014, traffic count data was also collected on each study segment for a period of 72 hours in order to calculate Average Daily Truck Traffic (ADTT) for these roadways.

After completion of the data collection effort, the video recordings were used to count the total number of inbound and outbound multi-unit trucks at each location during the AM, Midday, and PM study periods. The last four characters of the front license plate of each truck were also recorded, along with the time at which the truck was observed. Only front license plate data was recorded, since the rear license plate may change if a truck were to drop off or change its load before exiting the cordon, preventing a match when the truck leaves the study area. In the event that a front license plate was illegible or not present, the truck was included in count data for the subject location and marked as a missed license plate.

## **ANALYSIS & DISCUSSION**

The results of the license plate survey were summarized and reviewed in order to determine how many trucks performed through trips across the study area within defined periods of time. A through trip was defined as any truck license plate that was recorded entering the study period at one location and exiting at another (different from the point of entry) within any of the three-hour study periods. Additionally, a secondary analysis was performed to determine how many of these through truck trips passed through the IL 23/IL 38 intersection in the course of their journey. It is important to note, however, that the sample size of license plate data is relatively small, making it difficult to draw precise conclusions about truck routing behaviors as a result of this project. The use of high-definition digital video equipment, which allows recordings to be slowed down and played back as needed to view license plates, enabled the project team to maximize the amount of data collected during the relatively short, nine-hour



study period. As a result, over 86 percent of the nearly 1,200 inbound multi-unit trucks observed on the video recordings had legible license plates that were documented for the purpose of license plate matching. Total equipment failure was experienced at only one location, IL 38 west Annie Glidden Road during the PM study period, so data for this location was based solely on the travel patterns observed during the AM and Midday periods. The results of these routing analyses are detailed in the following subsections.

### Non-Stop Through Truck Trips

As an initial query, license plate data was reviewed to estimate what percentage of truck traffic performs through trips across the study area without stopping. As defined in the 2007 Truck Routing Study, it was assumed that a 45-minute window of time would be sufficient to allow a through truck trip to travel directly between any of the external study locations with minimal stopping. In other words, trucks traveling across the study area within 45 minutes are assumed to be passing through and not performing local deliveries. The results of this query are presented in the first column of **Table 1** below. To provide context to these results, license plate data was also reviewed for through truck trips that were completed within the entire three-hour study period, as shown in the second column of Table 1. Calculations were performed independently for each study period (AM, Midday, and PM), and the below results reveal the combined results of these three periods.

**Table 1. Observed Percentage of Through Truck Trips**

Location	Percentage of Trucks that Travel Through within 45 Minutes	Percentage of Trucks that Travel Through within 3-Hour Study Period
IL 23 south of Gurler Road	17%	30%
Fairview Drive east of IL 23	2%	12%
Peace Road south of Fairview Drive	5%	7%
IL 38 west of Somonauk Road	11%	15%
IL 64 east of Airport Road	33%	36%
Plank Road east of IL 23	19%	22%
IL 23 north of Plank Road	15%	22%
IL 64 east of Annie Glidden	32%	39%
IL 38 west of Annie Glidden	28%	36%
Annie Glidden Road north of Fairview Drive	5%	5%
<b>Average</b>	<b>14%</b>	<b>19%</b>

As shown above, an estimated 14 percent of multi-unit trucks that entered the study area are performing non-stop through trips across the region within 45 minutes. This value is twice as much as that observed in 2007, when an estimated seven percent of trucks were performing non-stop through trips. While these differing outcomes may reveal a change in truck routing patterns over the last several years, some differences between the 2007 and 2014 studies may also influence these results. The 2007 study was performed by field technicians equipped with



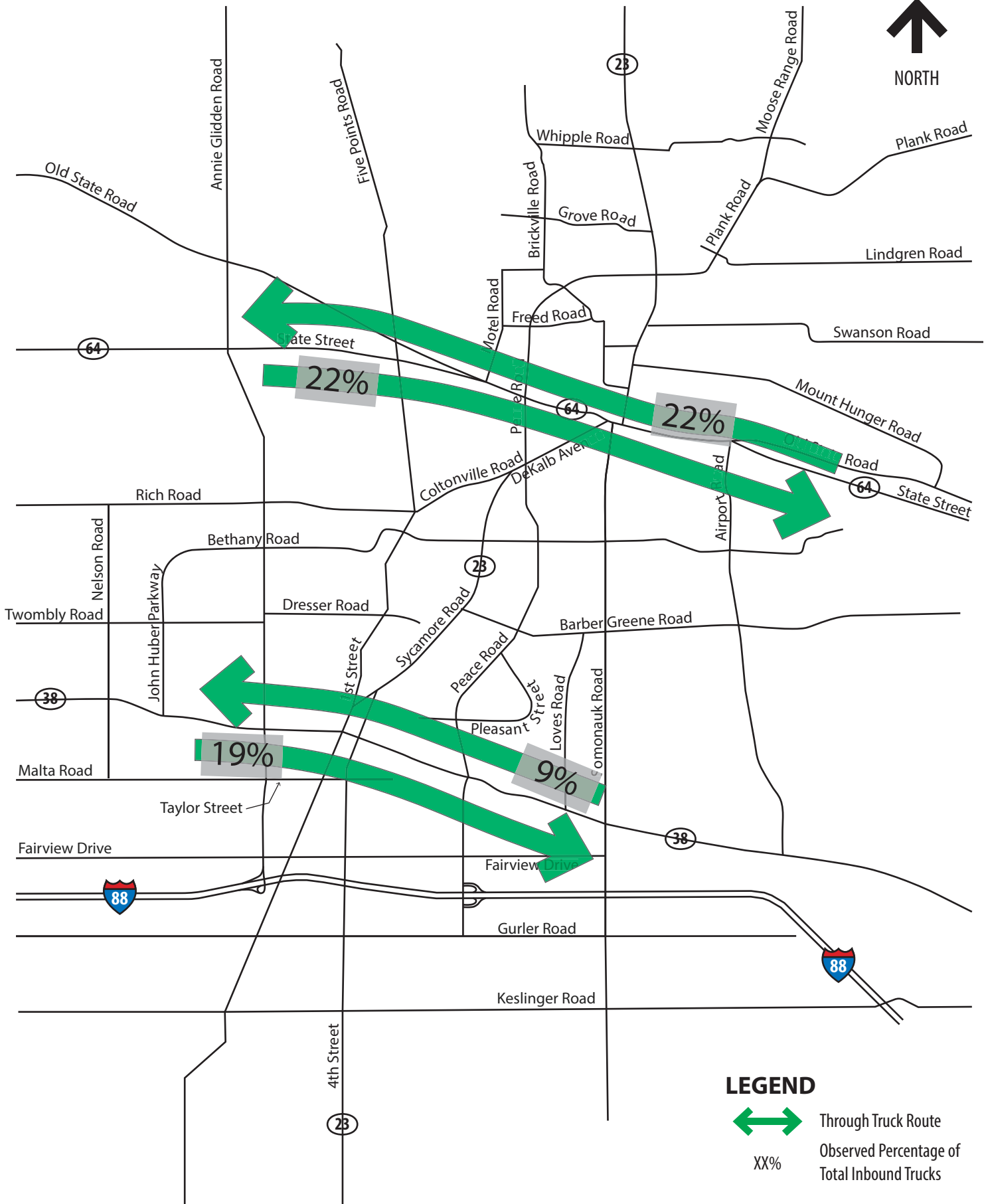
digital audio recorders. This method of data collection allows for more error than the use of video recordings, since playback for missed or indistinct license plates is not an option. This previous data collection approach can also be subject to misread license plates for characters with similar appearances, such as B and 8. Errors may also have occurred during data transcription due to the confusion created by rhyming letters, such as B, C, D, E, and so on. It is also possible that the 2007 study considered through truck trips as a percentage of all truck traffic, instead of just multi-unit trucks. This alternate approach could yield a lower percentage of through trips, even if the quantity of through trips is relatively similar to that observed in 2014. If a larger, three-hour time window is considered, an estimated 19 percent of trucks pass through the study area, matching that noted in the 2007 study.

While the noted differences in the 2007 and 2014 study methodologies make it difficult to compare results directly, the relative magnitude of through truck trips at each of the study locations can be considered. For example, the results of the 2007 study suggested that IL 38 west of Somonauk Road was the most popular point of entry into the region for through truck trips, nearly twice as much as any other study location. The two next most popular points of entry were Fairview Drive east of IL 23 and IL 64 east of Airport Road. The results of the 2014 study, on the other hand, indicate that IL 64 east of Airport Road and IL 64 east of Annie Glidden Road had the highest rate of through truck trips, followed closely by IL 38 west of Annie Glidden Road. IL 38 west of Somonauk Road fell to the seventh most popular point of entry for through truck trips.

When reviewing the points of entry and exit to determine the most popular paths through the DSATS region, it can be noted that key truck routes stem from the area's state routes: IL 23, IL 38, and IL 64. This result is not unexpected given the intent of these arterials to serve regional trips. These routes are illustrated in **Exhibit 2** for east-west travel and in **Exhibit 3** for north-south travel. It is important to state that the intermediate roadways used for these routing patterns are not known, with the exception of those that passed through the IL 23/IL 38 intersection, as discussed in the subsequent section.

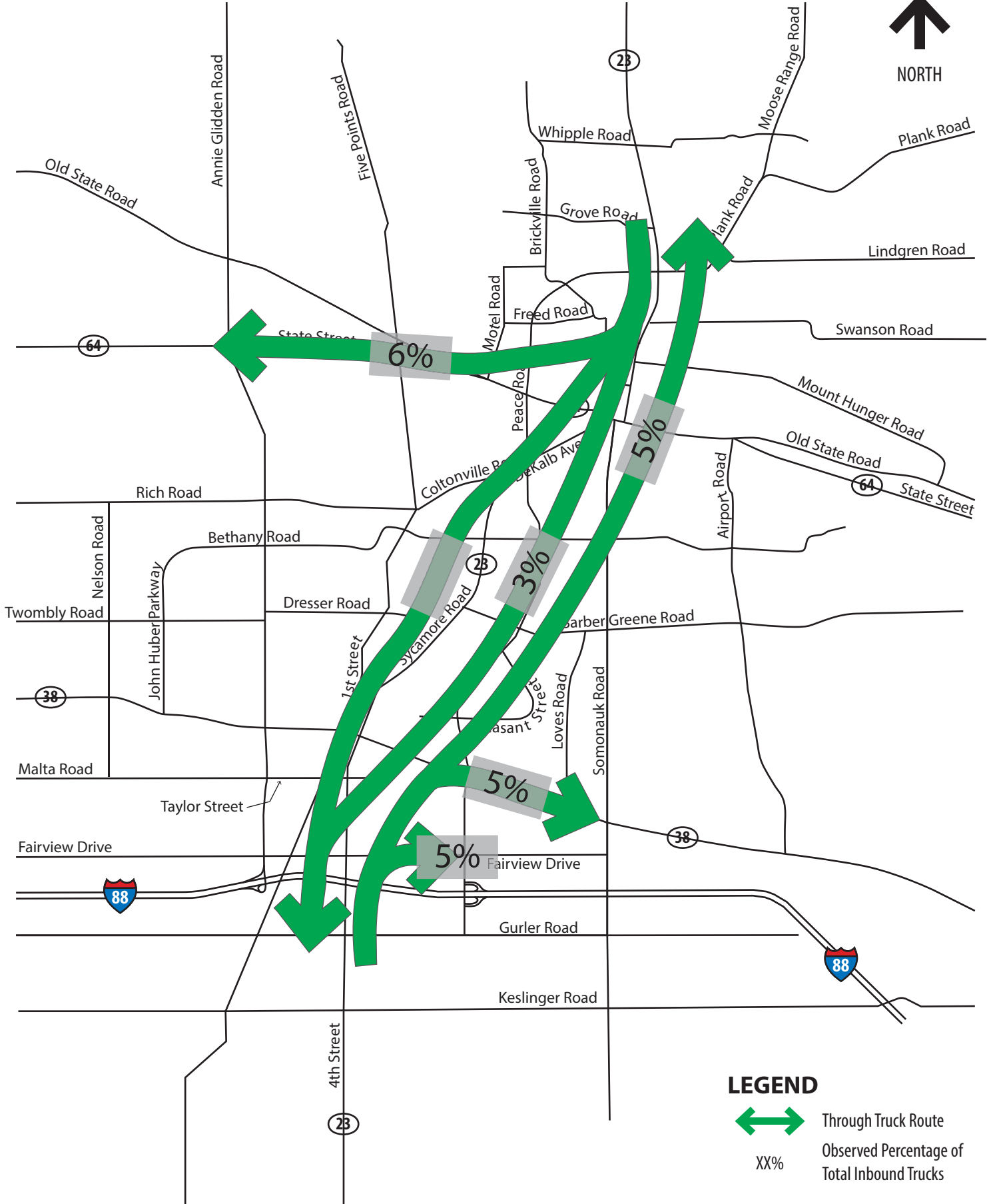
### **Through Truck Trips in Downtown DeKalb**


For a second data query, the assessment was modified to determine what percentage of truck trips are non-stop (taking 45 minutes or less) and also passed through downtown DeKalb via the IL 23/IL 38 intersection. The results of this query are presented in **Table 2**.



**LEGEND**  
 Through Truck Route  
XX% Observed Percentage of Total Inbound Trucks





**LEGEND**  
 Through Truck Route  
XX% Observed Percentage of Total Inbound Trucks



**KEY NORTH-SOUTH ROUTES FOR THROUGH TRUCK TRIPS**  
**EXHIBIT 3**





**Table 2. Observed Percentage of Through Truck Trips at IL 23/IL 38**

Location	Percentage of Trucks that Travel Through within 45 Minutes via IL 23/IL 38
IL 23 south of Gurler Road	1%
Fairview Drive east of IL 23	1%
Peace Road south of Fairview Drive	0%
IL 38 west of Somonauk Road	2%
IL 64 east of Airport Road	0%
Plank Road east of IL 23	0%
IL 23 north of Plank Road	2%
IL 64 east of Annie Glidden	0%
IL 38 west of Annie Glidden	19%
Annie Glidden Road north of Fairview Drive	0%
<b>Average</b>	<b>1%</b>

Based on the above results, it appears that only one percent of trucks are through trips that utilize the IL 23/IL 38 intersection as a part of their route. In 2007, nearly two percent of trucks were through trips observed in downtown DeKalb. Given that the 2014 study is believed to provide more accurate results and more conservative percentages (for the reasons named previously), it can be assumed that through truck traffic in downtown DeKalb has decreased since 2007.

The route most commonly utilized by through truck trips in downtown DeKalb begins on IL 38 west of Annie Glidden Road; 19 percent of trucks entering the study area at this location passed through the area within 45 minutes and were observed at the IL 23/IL 38 intersection during this timeframe. Given that all of these trucks were recorded exiting the study area at IL 38 west of Somonauk Road, it makes sense that these trucks remained on IL 38 for the entirety of their trip through the region.

In order to understand how many non-local trucks could be traveling through the downtown district, **Table 3** presents the number of trucks at IL 23/IL 38 as a percentage of through truck trips per study location. The following percentages refer to trucks in downtown DeKalb as a proportion of truck trips that entered and exited the study area within 45 minutes.





**Table 3. Portion of Through Truck Trips that Use IL 23/IL 38**

Location	Percentage of Through Trucks that Utilize IL 23/IL 38
IL 23 south of Gurler Road	7%
Fairview Drive east of IL 23	50%
Peace Road south of Fairview Drive	7%
IL 38 west of Somonauk Road	20%
IL 64 east of Airport Road	0%
Plank Road east of IL 23	0%
IL 23 north of Plank Road	11%
IL 64 east of Annie Glidden	0%
IL 38 west of Annie Glidden	70%
Annie Glidden Road north of Fairview Drive	0%
<b>Average</b>	<b>10%</b>

On average, only 10 percent of through truck trips travel through the IL 23/IL 38 intersection in downtown DeKalb. As alluded to previously, through trucks entering the region on IL 38 west of Annie Glidden are the most likely to be found in downtown DeKalb, since so many of these trucks were observed exiting the area on IL 38 west of Somonauk Road. Fairview Drive east of IL 23 is also shown to be a point of entry for many through trucks in downtown DeKalb, potentially due to the restriction against truck traffic on Fairview Drive between IL 23 and 1<sup>st</sup> Street.

### Quantifying Through Truck Traffic

With the collection of ADTT data at each of the study locations, the results of the license plate survey can be used to estimate how many through trucks enter the DSATS region each day. **Table 4** presents the ADTT, the number of average daily multi-unit trucks, and the percentage of non-stop through trucks observed at each study location. To estimate the number of through truck trips, the latter two values are multiplied together. The findings of this calculation are provided in the rightmost column.



**Table 4. Estimated Daily Number of Through Trucks**

Location	Average Daily Truck Traffic	Average Daily Multi-Unit Truck Traffic	Percentage of Trucks that Travel Through within 45 Minutes	Estimated Daily Number of Through Truck Trips
IL 23 south of Gurler Road	493	273	18%	49
Fairview Drive east of IL 23	772	461	3%	14
Peace Road south of Fairview Drive	1,838	1,421	5%	71
IL 38 west of Somonauk Road	759	356	11%	39
IL 64 east of Airport Road	573	341	33%	113
Plank Road east of IL 23	467	120	19%	23
IL 23 north of Plank Road	1,040	720	15%	108
IL 64 east of Annie Glidden	632	385	32%	123
IL 38 west of Annie Glidden	789	257	28%	72
Annie Glidden Road north of Fairview Drive	491	146	5%	7
<b>Total</b>				<b>619</b>

Based on an estimated 619 multi-unit trucks making through trips in the DSATS region each day, it can be derived that approximately 62 multi-unit trucks in the downtown DeKalb area are not traveling locally. This equates to about 10 percent of the average 595 multi-unit trucks observed at the IL 23/IL 38 intersection during the 72-hour count performed for this study.

## CONCLUSION

The results of this study reveal that an estimated 14 percent of multi-unit truck traffic entering at the 10 peripheral locations evaluated for this study are non-local trucks that pass through the region within 45 minutes. By matching license plate data for these trucks to those observed at the IL 23/IL 38 intersection, it is estimated that only one percent of trucks are making non-local trips through downtown DeKalb. These percentages reveal that a relatively low portion of truck traffic is passing through the DSATS region without stopping.

With the use of high-definition digital video equipment, license plate data was able to be collected for this study with a high level of accuracy; 86 percent of inbound trucks were recorded as a part of this license plate survey. This data collection method is one key differentiator between this study and the Truck Routing Study performed in 2007. In addition, it is possible that the 2007 study evaluated through truck trips as a percentage of all truck traffic (both single- and multi-unit), while this 2014 study considered only multi-unit trucks when estimating the percentage of through trips being performed. The approach used in this memorandum is believed to provide a more accurate view of the kind of through truck trips that most concern the community: those performed by heavy tractor-trailer-type vehicles.

While direct comparisons cannot be drawn between the 2007 and 2014 studies, it is TADI's opinion that the general findings of the two studies are relatively similar. As noted in the 2007 Truck Routing Study, the findings of this evaluation do not support the public perception that



non-local trucks frequently travel through the downtown DeKalb area as an unofficial I-88 bypass route to and from Rochelle and other destinations along the I-39 corridor. It is important to note, however, that this study was performed with a very small sample size of license plate data. While the data collection methods provide a high level of confidence in the results, the outcomes of this study only represent nine hours of data collection on a single day. As such, it is not recommended that individual values presented in this study be used to draw anything beyond general conclusions about truck routing behaviors in the DSATS region.

Please do not hesitate to contact this office with any further questions on this matter.